

A Vision for Physics Higher Education Research in the United Kingdom and the Republic of Ireland



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Motivation and aims

1. Establish in which University departments PER activity takes place
2. Understand the impact UK and Ireland PER has on practice for learning and teaching of physics in the higher education sector
3. Share stories from successful initiatives which have led to PER activities or networks
4. Identify existing barriers which may prevent our PER community to thrive
5. Determine how best the PER community can be supported for a growing impact nationally and internationally

Why PER matters more than ever

PER plays a critical role in enhancing the quality of physics higher education.

- Covid-19
- AI
- changing student demographics
- growing expectation for evidence-based teaching

Research questions

- What is the current PER landscape?
- What enables or constrains PER activity?
- What conditions are needed for sustained impact?

Methodology

- The first part of the study is a **desk-based review** of publicly available information from **57** University / Department websites with IOP-accredited degree programmes.
- Based on our findings, a **survey** was designed and distributed to PER practitioners, academic staff, and Directors of Learning and Teaching (**41** respondents).
- **Focus groups** were organised to bring richer understanding of good practice.
- Final report presents **findings, case studies, and recommendations** to sector.

Finding 1: The PER community is larger than many realise

Out of the 57 departments reviewed, we identified

- **Sizeable community** of ~ 120 staff involved in PER
- PER groups in 20 institutions

However,

- **few university Physics departments promote PER**
- Among departments where we could identify information on staff engaged in physics education research, the **details available vary in quantity and quality**.

A similar conclusion can be drawn about **promotion criteria** to support academic activity in PER.

Finding 2: Visibility matters

Importance of increasing the visibility of our community at all levels: locally within a department and institution; nationally; and internationally.

Reasons for this all revolve around the central concept of recognition.

- Be in a position of influence locally to shape learning and teaching practice within one's own institution for the benefit of students and staff
- Improve perceptions from colleagues and students about scholarship and education research
- Professional development
- Career evolution and promotion
- Opportunities for collaboration locally and across institutions
- Invitations to speak at seminars and conferences
- Impact at a national or international level
- Enhanced reputation to attract funding

Finding 3: Recognition and career progression remain uneven

- Vast majority of respondents have PER activity in department, 2/3 in a formal group.
 - 68% separate teaching pathway
 - 64% promotion criteria match job role
 - Only 46% think promotion criteria are effective to support career development
- Policy changes are happening, but implementation remains inconsistent.

Finding 4: Funding is the critical bottleneck

The lack of sustainable funding in all aspects of PER is a major issue. Funding would enable considerable progress for PER to influence practice and policy.

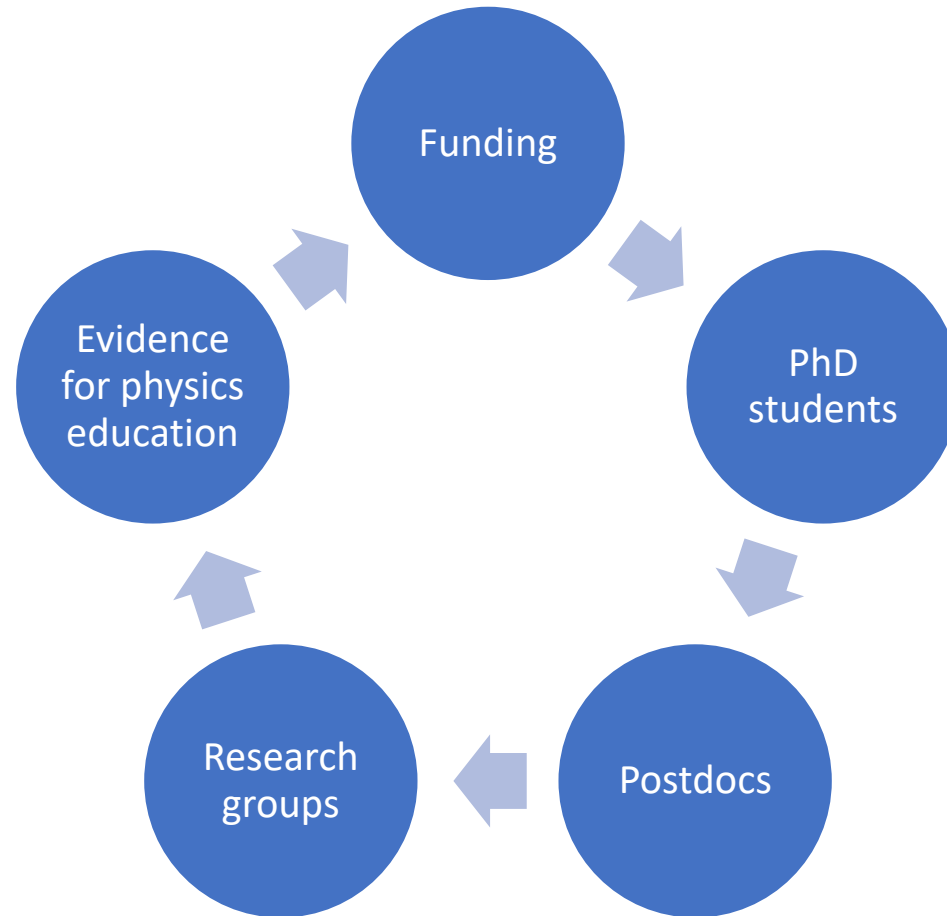
In the survey **only 57%** indicated that staff could access funding to attend education conferences...

71% of survey respondents reported they had opportunities to supervise education projects with undergraduates or PGT students.

Only 38% reported the opportunity to supervise PhD students. But the level of available funding is not usually sufficient to hire PhD students.

Clear lack of capacity-building mechanisms!

Finding 5: Infrastructure gap



Is this just a UK / Ireland problem?

International networks are key to developing a vibrant community.

- GIREP; AAPT; APS; IUPAP
- PERC
- ESERA

Integrating diverse perspectives and methodologies to address common educational challenges.

How many countries have stable PER funding pathways?

In summary...

- PER is active, growing, and supported by a vibrant, evidence-driven community.
- Engagement with PER is key to implementing effective teaching changes.
 - Build on momentum to ensure sustained high-quality teaching and learning of physics.
 - Ongoing dissemination and demonstration of impact are essential.
- PER community plays a vital role in training future physicists for societal impact.
- Greater support needed from departments, institutions, and funders.

Our vision: Five priorities

- 1. Visibility**
- 2. Evidence of impact**
- 3. Career development**
- 4. Institutional support**
- 5. Sustainable funding**

International collaboration

Full report with case studies and recommendations now available on per-he.org (also a few hardcopies available here!)

- Share it
- Replicate this study nationally
- Compare landscapes internationally
- Let's advocate together!



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Conclusions

- Active PER community
- PER has impact
- Challenges exacerbated by lack of adequate infrastructure to realise its full potential
- The structural issues identified in this study are **not unique** to the UK and Ireland.
- Similar pressures are seen across global physics education systems.

We invite all conference participants to explore opportunities for international partnerships to replicate or adapt this study in their own national contexts, enabling comparative analyses, and coordinated advocacy for the global recognition and funding of PER as essential educational infrastructure.

Thanks

We gratefully acknowledge the financial support of the Institute of Physics towards the realisation of this project.

Heartfelt thanks to all who participated in the survey and focus group discussions, as well as to the authors of the case studies presented in this report: Pippa Petts; Michael Fox; Sally Jordan; Eilish McLoughlin; Helen Cramman; Gareth Jones; Helen Vaughan; Astra Sword

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University
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ASTRONOMY
& PHYSICS
EDUCATION

Thank you

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Reimagining University Physics and Astronomy: Educational Methods for the Years Ahead

The aim of this Research Topic is to advance understanding of how students learn physics and astronomy at university level and to identify educational methods that improve engagement, inclusion, and conceptual understanding.

Topics may include (but are not limited to):

- Studies on how students learn physics and astronomy from introductory to advanced levels;
- Evaluations of active learning, problem based learning, and laboratory or project based approaches;
- Inclusive and equitable teaching practices, including approaches that address attainment gaps and diverse learner needs;
- Assessment design, authentic assessment, feedback practices, and links between assessment and disciplinary identity;
- Comparative studies across institutions, countries, programme structures, or student groups;
- The impact of generative AI on teaching, learning, workload, assessment and feedback.

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Submission deadlines

Summary: 30 June 2026

Manuscript: 30 October 2026

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